

**STRIP OF FASTENERS FOR A FASTENING APPARATUS WITH LOADING
DEVICE INTENDED TO TAKE THE STRIP, THE APPARATUS AND THE
LOADING DEVICE**

The field of the invention is that of fasteners of the nail or wall plug type, comprising a shank with a rear head and a pointed front end.

In general, for this, use is made of an indirect-acting fastening apparatus and a fastener is introduced automatically into the barrel using a loading device.

In order for the fastener to remain perfectly coaxial with the barrel, for it not to tilt about the axis, and for it therefore to remain correctly guided while it is being driven into the barrel of the apparatus after the apparatus has been fired and before the fastener is introduced into the receiving material, it has already been proposed for a guide peg or washer to be slipped over the shank of the fastener.

Fasteners for the guide peg may come in strip form, their pegs strung together in a string, the strip being mounted in a loading device with a return spring so that when the loading device is mounted on the apparatus, the strip is pushed and a guide peg is introduced into the barrel before each firing action. A string of guide pegs is described, for example, in patent EP 0 502 667.

It will be noted that, with fasteners in strip form, after each firing, the peg of the element that is to be driven is separated from the adjacent peg by shearing by the weight in the apparatus and then, as the fastener is driven into the receiving material, the peg acts as a shock absorber and washer.

However, while arranging pegs in a string may be effective in guiding a fastener in the barrel or the plug guide as long as the guide peg of the fastener considered is still attached to an adjacent peg still situated in the loading device, the same is no longer true when the last fastener of the strip is reached and has to be transferred from the loading device into the barrel, because its guide peg is no longer held either by the adjacent peg or by the wall of the internal bore of the barrel (or the plug guide) open onto the loading device. It can therefore tilt and jam the apparatus.

It is in order to avoid this fact that the applicant company is proposing its invention.

To this end, the invention relates first of all to a strip of fasteners for a fastening apparatus with a loading device intended to take the strip, each fastener comprising a shank pointed at one end and bearing a head at the other end, the fasteners being engaged respectively via their shanks in guide pegs joined together into a string before they are transferred, one by one, from the loading device into the apparatus, in the firing position, the strip being characterized in that at least one of the guide pegs at the end of the string comprises support means designed to prevent it from tilting as it is transferred from the loading device into the apparatus.

Thus, the last fastener is prevented from tilting in the barrel or the plug guide.

As the strip of fasteners may be introduced into the loading device in either of two directions, it is preferable for the two end guide pegs of the strip at least to comprise support means.

Advantageously, the support means comprise at least one lug extending transversely to the overall plane of the strip.

As a preference, each peg comprises two transverse lugs which are symmetric with respect to the overall plane of the strip, thus balancing the support.

Advantageously, all the pegs of the strip have support lugs, by virtue of which, if a strip is broken, the parts of the strip remain usable.

The invention also relates to an indirect-acting fastening apparatus with a weight intended to be propelled along a bore to drive a fastener of a strip of fasteners as defined above and accommodated in a loading device of the apparatus, which apparatus is characterized in that the bore in which the weight is intended to be propelled and which is intended to receive the fastener with its guide peg provided with support means is designed to accommodate the said support means.

In the preferred embodiment of the apparatus of the invention, the said bore in which the weight is propelled is grooved so as to accommodate at least one support lug of the guide pegs of the strip of fasteners.

The invention relates finally, and by way of intermediate product, to a loading device for an indirect-acting fastener apparatus with a weight intended to be propelled along a bore to drive a fastener of a strip of fasteners, the loading device being designed to take the strip of fasteners and comprising a chamber to house the guide pegs of the fasteners of the strip, the chamber being designed to accommodate the said support means of the guide pegs.

In the preferred embodiment of the loading device of the invention, the chamber accommodating the guide pegs of the loading device is grooved to accommodate at least one support lug of the guide pegs of the strip of fasteners.

The invention will be better understood with the aid of the following description of the preferred embodiments of the strip of fasteners, of the fastening apparatus and of the loading device of the invention, with reference to the appended drawing, in which:

- Figure 1 is a view in section of a fastening apparatus and of its loading device of the prior art;
- Figure 2 is a perspective view of the strip of fasteners of the invention;
- Figure 3 is a section view of the fastening apparatus and of its loading device of the invention;
- Figure 4 is a view in section of the fastening apparatus and of the loading device, on IV-IV of Figure 3, and
- figure 5 is a view in section of the loading device on V-V of Figure 3

By way of preliminaries, as the loading device can, depending on the apparatus, be mounted either on its barrel, or on its brad guide, the remainder of the description will speak of the body of the apparatus in order to denote either one of these items without expressing any preference.

In addition, as Figure 1 relates to the prior art, the elements of the apparatus of the prior art and of the apparatus of the invention which are the same will be associated with the same references.

With reference to Figure 1, the fastening apparatus 10 comprises a body 2 and a loading device 3.

In the body 2 of axis 9 there slides a weight or piston 5 for driving a fastener 1, in this instance the last of a strip, depicted in the figure in the process of being transferred from the chamber 6 that takes the strip in the loading device 3 towards the bore 4 of the body.

The fastener 1 comprises a shank which is pointed at one end 8 and has a head 7 at the other end. It is held in a guide peg 11 to guide it in the bore 4 of the body.

As this is the last fastener in the strip, it is not held by an adjacent peg and can tilt in the bore of the body in a movement illustrated by the arrows.

To prevent this movement, with reference to Figure 2, the guide pegs for the fasteners of the strip, forming a string 20, and in this instance not only the end pegs of the strip 11' and 11'' but all the other pegs 11 also, have support lugs 14.

Each guide peg 11 has a part 110 which is generally tubular, intended to take the shank 1 of a fastener, and a ring 111, surmounting the tubular part 110, also intended to take the shank of the fastener, about its portion adjacent to the head 7 which is itself intended to bear against this ring 111. The ring 111 is slightly oblong, with a major axis running transversely, here perpendicular, to the general plane 112 of the string 20 and therefore of the strip of fasteners when the fasteners are engaged within their guide pegs.

The support lugs 14 are formed as a projection on the ring of the pegs, at the ends of its major axis and, in this instance, in the end plane 115 of the ring. In a plane transverse to the axis of a guide peg 11, the support lugs 14 thus project out of the overall diameter of the guide peg 11. These are small half-moon lugs.

Accordingly, the chamber 6 of the loading device 3 is grooved and has two grooves 15 for accommodating the lugs 14 of the rings of the guide pegs 11.

The linear grooves 15 of the loading device are continued into the body 2 in the form of two small grooves 17 formed in the wall of the bore 4 and also intended to house the support lugs 14 of the guide pegs 11.

In operation, and having introduced a strip of fasteners 1 into the chamber 6 of the loading device 3, the strip is pushed by a slider 16 acting on the action of a spring, not depicted. The support lugs 14 of the slide pegs 11 slide in the grooves 15 of the loading device 3 and the grooves 17 of the body of the apparatus and with each new cycle of the weight 5, another

fastener 1 is transferred into the bore 4 of the body 2 of the apparatus. It will be noted that the fastener 1, driven by the weight 5, will be guided herein in the bore 4 not only by its guide peg 11 but also by a washer 18.

As long as there are still two fasteners remaining to be driven into a receiving material, there are not too many problems. However, when only one remains, the support lugs 14 of its guide peg 11 will come fully into effect. They will hold the guide peg 11 and, with it, the fastener 1, laterally and thus prevent it from tilting. Any operational anomaly on the last shot is thus prevented.

Because of the continuity between the grooves 15 of the loading device 3 and the grooves 17 of the bore 4, the support function of the lugs 14 is continuously fulfilled from the loading device 3 to the bore 4, and continues within the bore 4 until firing time.

The string 20 described is a string of guide cavities (pegs) 11 with two transverse support lugs 14. Naturally, it would be possible to settle for providing just one on each peg.

Likewise, the support lugs described are half-moon shaped. It would also have been possible to envisage trapezoidal lugs or even rectangular ones. In any event, it is necessary, but sufficient, for the overall transverse diameter of each cavity, in the plane of the support lugs, to exceed the diameter of the cavity outside this plane, that is to say the diameter of the bore 4 in which the weight 5 slides.

In the figures, the body of the apparatus and of its loading device, which are two different pieces, although joined together, are hatched in the same way. Of course, it will have been understood that this is merely to simplify the drawing.